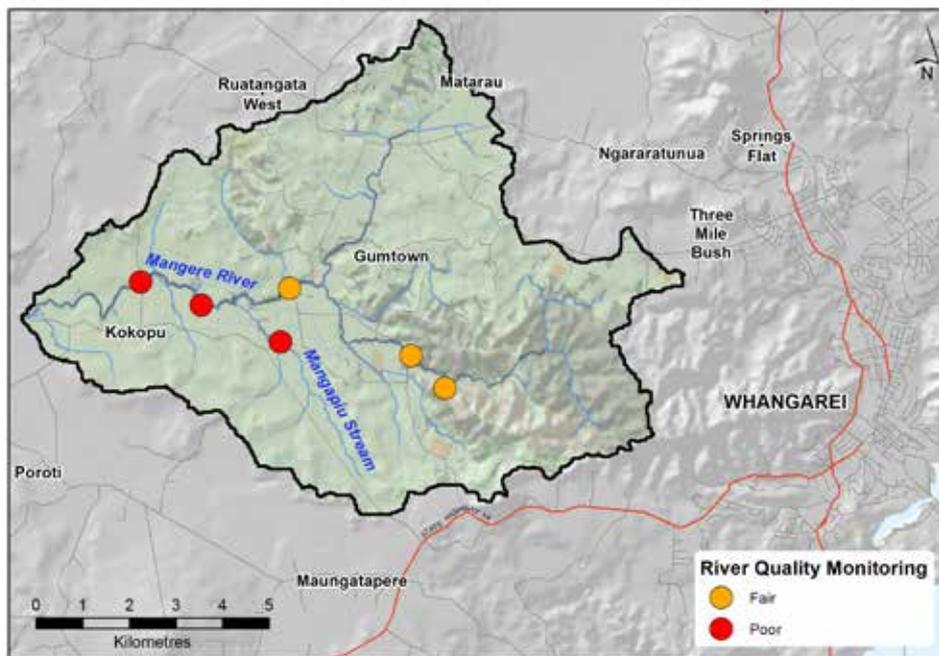


Water quality and ecology

State of water quality in Mangere catchment

Six Mangere catchment sites monitored from 2007 to 2010 showed that water quality degraded significantly between upstream and downstream sites. The Mangapiu Stream had particularly poor water quality with none of its water quality indicator medians meeting the national water quality guideline values. One Mangere catchment site is currently monitored for water quality – Mangere River at Knight Road.

Results from 2007-2011 indicate Mangere has 'poor' overall water quality. Issues with some aspects of water quality and ecological health led to just one of six stream health indicator medians meeting national guidelines. However, trend analysis indicates that water quality is getting better, with a significant improvement (reduction) in nutrient levels over the past decade.



Water quality issues

E. coli bacterium is an indicator of the presence of human or animal faecal contamination. Less than 1% of *E. coli* samples met the national stock drinking water guideline.

Dissolved Reactive Phosphorous (DRP) is a measure of the soluble phosphorus compounds readily taken up by plants and algae. It provides a useful indication of a waterbody's ability to support nuisance algal or plant growths. Less than 1% of DRP samples met the national guideline.

Nitrogen contributes to nuisance growths of periphyton and aquatic plants that can degrade aquatic ecosystem health. Just 28% of nitrogen samples met the national guideline.

Turbidity indicates how much suspended sediment is in the water. Turbid water can make water unsuitable for swimming and stock drinking, and can also harm aquatic life. Only 34% of turbidity samples met the national guideline.

Water quality index

A water quality index is used to enable comparison between Northland's rivers and streams. The water quality index is calculated using the median values for six variables (see identifiers in Table 1).

Using the water quality index, water quality at each site can be classified into one of four categories according to how many medians meet national guideline values.

Excellent: median values for all six variables meet guidelines.

Good: median values for five variables (one of which must be dissolved oxygen) meet guidelines.

Fair: median values for three or four variables (one of which must be dissolved oxygen) meet guidelines.

Poor: median values for less than three variables meet guidelines.

Table 1: Ministry for the Environment water quality guideline values

Identifier (+unit)	Abbreviation	Reference	Guideline value
Dissolved Oxygen	DO	RMA 1991 Third Schedule	≥80 (% saturation)
Dissolved Reactive Phosphorous	DRP	ANZECC (2000)	≤0.010 (mg/L)
<i>Escherichia coli</i>	E. coli	ANZECC (1992)	≤126 (cfu/100 mL) Stock Drinking Water
Ammoniacal Nitrogen	NH ₄	ANZECC (2000)	≤0.021 (mg/L)
Nitrite-Nitrate Nitrogen	NNN	ANZECC (2000)	≤0.444 (mg/L)
Turbidity	TURB	ANZECC (2000)	≤5.6 (NTU)

Table 2: Water quality results for Mangere River at Knight Rd (2007-11)

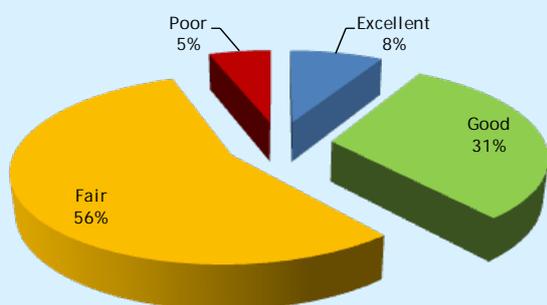
	DO % sat	DRP mg/L	E. coli MPN/100 mL	NH4 mg/L	NNN Mg/L	TURB NTU
Median	83.8	0.054	691	0.04	0.596	6.9
Minimum	38.3	0.01	74	0.01	0.013	2
Maximum	119.2	0.373	24192	0.35	2	90
Number of samples collected	111	108	111	109	109	97
Number meeting guidelines (%)	68.5%	0.9%	0.9%	28.4%	37.6%	34.0%
Median meets guidelines	yes	no	no	no	no	no

Water quality index category: Poor

Regional comparison

Mangere River's 'poor' water quality index score places it in the bottom 5% of Northland's monitored rivers.

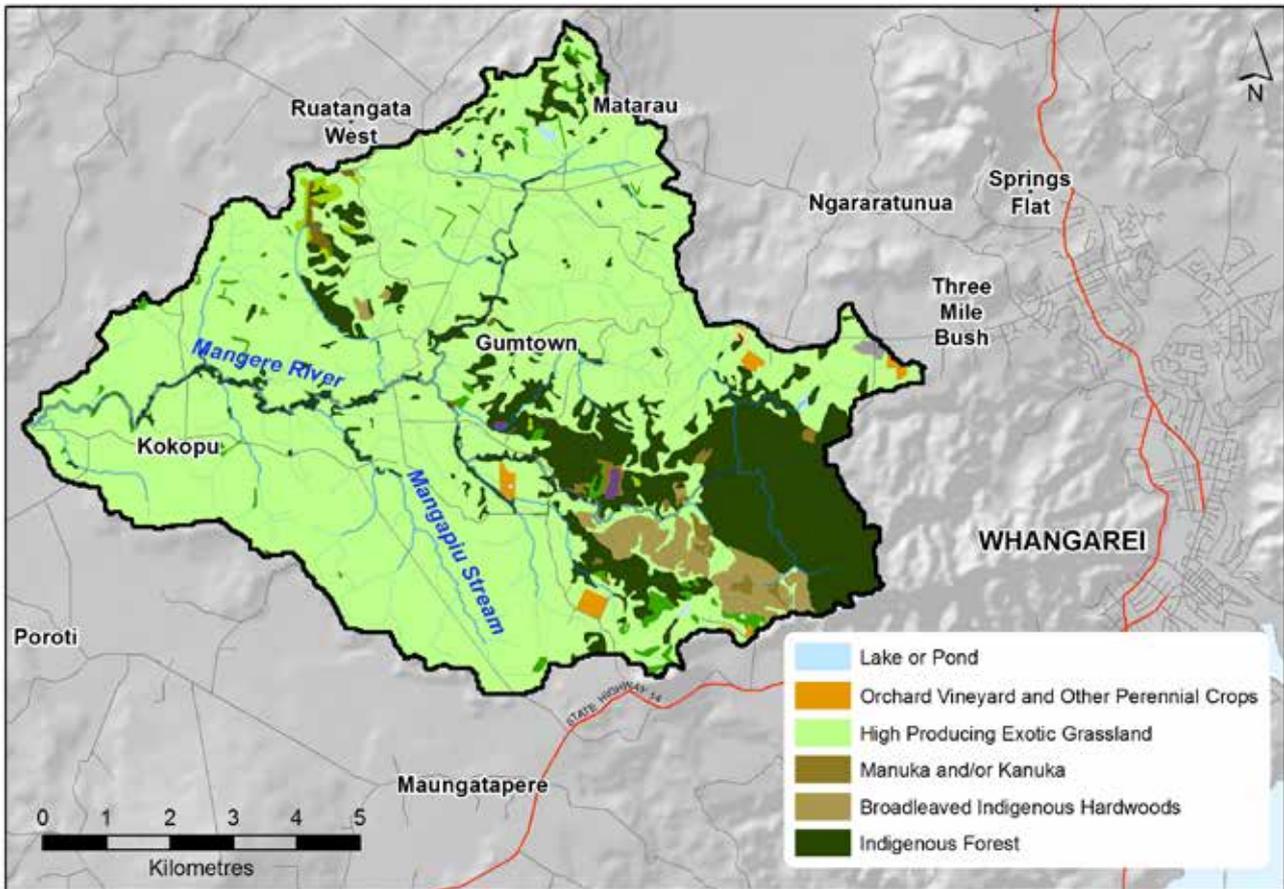
Percentage breakdown of overall water quality grade at monitoring sites



Land use and water quality

The Mangere River is a low-lying, slow-flowing tributary to the Wairua River, which flows through a mostly intensive agricultural catchment.

Soft sedimentary rock dominates the underlying geology of the area, exacerbating erosion issues.



Land use in Northland

Northland has a variety of landforms, soil types and associated land uses. In Northland, farming, forestry and horticulture collectively contribute 13.7% of the region's Gross Domestic Product (GDP).

The future of these industries depends on maintaining the productive capacity of Northland's soils. The consequence of poor soil management is not only the loss of productivity but also an increased environmental impact including the downstream degradation of water quality.

Land use pressure on water quality and biodiversity

Intensification of land use can impact on water quality and indigenous biodiversity in a number of ways. Although in recent years there has been retirement and regeneration of some areas of marginal land, this has often been negated by the

intensification of land use in the more productive areas.

Increased fertiliser use and the corresponding increase in stocking rates can lead to higher levels of loss of effluent and nutrients from farms to surrounding areas.

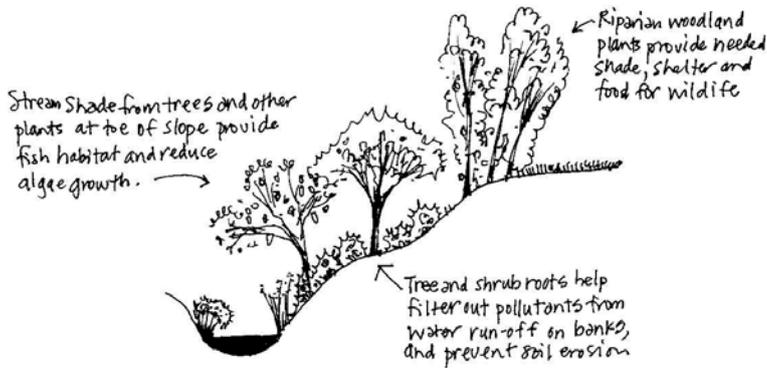
Dune lakes, gumlands, bogs and fens are examples of some of the habitat types in Northland that are particularly at risk. These ecosystems have developed under naturally low fertility conditions and the plant and animal species present are adapted to these conditions.

Nutrient enrichment brought about through the intensification of land use within the catchment can lead to rapid invasion by weeds leading to a system dominated by introduced species.

Freshwater ecology

Habitat quality

The Mangere River is surrounded by pasture. In many places livestock have direct access to the river which results in unstable banks and high in-stream sediment loads.



While the totara trees along much of the Mangere's stream bank provide good shade, little understory vegetation exists to help trap sediment. Stream diversity is poor due to the homogenous nature of the river which provides only one habitat and flow type.

Habitat assessment data is consistent with the poor water quality at the Knights Road site, resulting in 'MARGINAL' score for ecological health.



Invertebrates

The impoverished invertebrate community of the Mangere catchment, dominated by pollution tolerant species such as snails and fly larvae, reflects its degraded water and habitat quality.



Aquatic snail (credit DoC)

Fish

Fish diversity in the Mangere catchment is poor with only five species of freshwater fish being recorded. These include the longfin eel, shortfin eel, crans bully, common bully and brown trout. The poor fish community is likely to be a reflection of the degraded habitat and water quality in the Mangere catchment.



Common bully (credit Landcare Research)



Eel (credit NIWA)